

# **Iowa Department of Natural Resources**

## **Flood Plain Permit Program**

### **Accelerated Bridge Review Process**

#### Purpose:

The purpose of this process is to expedite the DNR's review of certain types of bridge projects. Bridge projects that qualify for this process will be granted priority (Out-of-Order) review upon request.

#### Qualification for Process:

The process is available to any applicant (City, County, IDOT, private business or individual) for bridges in rural (unincorporated) areas where the following is true:

1. There is no detailed Flood Insurance Study (FIS) on that particular stream (published or pending).
2. The project does not include any channel change where (i) more than a 500-foot length of the existing channel is being altered or (ii) the length of existing channel being altered is reduced by more than 25 percent (See 567-71.2(1)b IAC)
3. The project design does not include any levees or low head dam structures.
4. The project satisfies minimum DNR bridge criteria and will not require a variance.
5. Hydraulic analysis is accomplished using the IDOT Bridge Backwater Analysis software

#### Procedure Required for Accelerated Review Process:

1. The applicant makes Pre-Application submittal to DNR which includes the following:
  - a. Request for Hydrology Pre-Approval (HPA) using supplied form. The request for HPA must include all calculations and variables used in the calculations (e.g., drainage area, mean channel slope, Des Moines Lobe ratio, etc.).
  - b. The surveyed valley cross-section and rating curve that will be used for the design of the bridge project. The rating curve must be performed using the IDOT Bridge Backwater Analysis software. Included with the rating curve shall be:
    - i. A map showing the location of the valley cross-section in relation to the proposed bridge site. The cross-section should be located at the downstream control section of the flood plain but not more than 500 ft. downstream from the bridge.
    - ii. The surveyed stream profile based on at least two survey shots taken at least 500-feet upstream and downstream from the bridge.
    - iii. The survey elevation reference datum (e.g., NGVD29, NAVD88, etc.) used for the valley cross-section and stream slope.
    - iv. Photographs (stream channel, overbanks & upstream of bridge) for verification of Mannings "n" used for rating curve and upstream damage potential.

- v. A complete printed copy of the rating curve analysis resulting from the IDOT Bridge Backwater Analysis software.
  - vi. CD or floppy disk with the data file (.ibh extension) for the rating curve analysis resulting from the IDOT Bridge Backwater Analysis software.
  - c. The Pre-Application Checklist for Accelerated Bridge Review (Phase 1) attached to the submitted data as coversheet.
2. DNR reviews submitted data and replies to applicant with either concurrence or with required modifications to the hydrology and rating curve. Target for review is 3 weeks.
  3. Applicant designs bridge using hydrology and rating curve accepted by DNR. Hydraulic analysis of bridge must be done using IDOT Bridge Backwater Analysis software.
  4. Applicant submits application for bridge project to DNR. Application includes the following:
    - a. Completed and signed Form 36 (Joint Application Form). A copy of this application must also be submitted to the U.S. Army Corps of Engineers and the DNR Sovereign Lands Section).
    - b. Two-sets of certified engineering plans. Certified type, size and location (TS&L) plans are acceptable.
    - c. Copy of DNR letter regarding previously approved hydrology and rating curve.
    - d. Printout of bridge hydraulic analysis from IDOT Bridge Backwater Analysis Software
    - e. CD or floppy disk with data file (.ibh extension) of bridge analysis from IDOT Bridge Backwater Analysis Software.
    - f. Completed “Accelerated Bridge Review Process Analysis Guide & Summary” Form (Form provided by DNR) documenting results of analysis.
    - g. Letter requesting “Out of Order” processing of bridge on the basis that review will take less than 4 hours of staff time.
    - h. The Application Checklist for Accelerated Bridge Review (Phase 2) attached to the submitted data as coversheet.
  5. DNR staff reviews and permits project. Target for review and permit issuance is 1 month.

If applicant does not comply with the above listed procedures, if the application/pre-application lacks required information, or the project does not meet minimum DNR criteria, the application will not qualify for this accelerated processing or “Out of order” review and will become part of the normal project backlog.

# **Iowa Department of Natural Resources**

## **Pre-Application Checklist for Accelerated Bridge Review (Phase 1)**

In order for your project to qualify for Accelerated Bridge Review Pre-Approval, the following items must be submitted.

- ☐ Completed Request for Hydrology Pre-Approval
- ☐ Surveyed Valley Cross-Section, Including the Following:
  - ☐ Site Map Showing Location of Valley Cross-Section In Relation to Bridge Site
  - ☐ North Arrow
  - ☐ Surveyed Stream Profile
  - ☐ Survey Elevation Datum Reference
- ☐ Valley Cross-Section Rating Curve, Including the Following:
  - ☐ Photographs (Stream Channel, Overbanks & Upstream of Bridge) for Verification of Mannings “n” values and Upstream Damage Potential.
  - ☐ Printout of Rating Curve Analysis from IDOT Bridge Backwater Analysis Software.
  - ☐ Disk or CD with data file (.ibh extension) With Rating Curve Calculations from IDOT Bridge Backwater Analysis Software





## Using Flood Insurance Study (FIS)

FIS is for which community (name): \_\_\_\_\_

\*Drainage Area of stream as referenced in FIS: \_\_\_\_\_

Hydrologic Region (as per USGS Report 00-4233): \_\_\_\_\_

Drainage Area Ratio( $\frac{\text{DA at Project Site}}{\text{DA from FIS}}$ ): \_\_\_\_\_

From FIS:

Q50 (cfs): \_\_\_\_\_

Q100(cfs): \_\_\_\_\_

\*\*Adjusted for Drainage Area (if applicable):

Q50 (cfs): \_\_\_\_\_

Q100(cfs): \_\_\_\_\_

Applicable Calculations and Description of Method Used:

*\* If the drainage area of the stream at the project site is significantly different from the drainage area at the point referenced in the FIS, the design discharge estimates should be weighted as described on page 36 of USGS Report 00-4233.*

*\*\* To use this method, the drainage area at the project site should fall between 50% and 150% of the drainage area from the FIS.*

## Using USGS Regional Regression Equations (USGS Report 00-4233)

Hydrologic Region (as per USGS Report 00-4233): \_\_\_\_\_

\*Mean Channel Slope (MCS) in ft/mi: \_\_\_\_\_ (Needed if 3 variable equations are used)

Des Moines Lobe Ratio (DML) if applicable: \_\_\_\_\_

\*\*Mixed Region Ratios (if applicable): \_\_\_\_\_

Design Flood Discharges:

Q50 (cfs): \_\_\_\_\_

Q100(cfs): \_\_\_\_\_

Applicable Calculations and Description of Method Used:

\* See Appendix B in USGS Report 00-4233 for MCS at specific gage sites and USGS Report 03-4120 for MCS for streams with drainage area over 100 sq. miles.

\*\* See page 32 of USGS Report 00-4233 for instructions on calculating flows where the watershed is located in more than 1 hydrologic region.

## Using WRC Bulletin 17B (Log-Pearson III Analysis)

(Table 2 in USGS Report 00-4233 includes the recently published WRC Bulletin 17B estimates for gages on most Iowa streams.)

Stream Gage Referenced (name and number): \_\_\_\_\_

Location of Stream Gage (Sec/T/R, or River Mile): \_\_\_\_\_

\*Drainage Area of Stream at Gage: \_\_\_\_\_

\*\*Years of Record at Gage: \_\_\_\_\_

Drainage Area Ratio( $\frac{\text{DA at Project Site}}{\text{DA at Gage Location}}$ ): \_\_\_\_\_

Hydrologic Region (as per USGS Report 00-4233): \_\_\_\_\_

From WRC 17B Analysis:

Q50 (cfs): \_\_\_\_\_

Q100(cfs): \_\_\_\_\_

\*\*\*Adjusted for Drainage Area (if applicable):

Q50 (cfs): \_\_\_\_\_

Q100(cfs): \_\_\_\_\_

Applicable Calculations and Description of Method Used:

\* If the drainage area of the stream at the project site is significantly different from that at the referenced stream gage station, the design discharge estimates should be weighted as described on page 36 of USGS Report 00-4233.

\*\* If there are less than 20 years of record at the gage site, WRC Bulletin 17B methods may not be appropriate for estimating flow frequencies without weighting with regional regression estimates as described on page 35 of USGS Report 00-4233.

\*\*\* To use this method, the drainage area at the ungaged project site should fall between 50% and 150% of the drainage area at the gage.

## Other Methods or Sources Used

Method or Source Used: \_\_\_\_\_

Reason for Using This Method:

\_\_\_\_\_  
\_\_\_\_\_

Design Flood Discharges:

Q50 (cfs): \_\_\_\_\_

Q100(cfs): \_\_\_\_\_

Applicable Calculations and Description of Method or Source Used:



# **Iowa Department of Natural Resources**

## **Checklist for Accelerated Bridge Review Project Applications (Phase 2)**

In order for this project to be qualify for Accelerated Bridge Review Processing, the following items must be included with your bridge application

- ☐ Completed and Signed Form 36 (Joint Application Form)
- ☐ IDOT Form 1E (if applicable)
- ☐ Two-Sets of Certified Design Plans (1/2 size, hard copy) Containing the Following:
  - ☐ Survey Elevation Datum Reference
  - ☐ Scale
  - ☐ North Arrow
  - ☐ Site & Location Maps
  - ☐ Plan & Profile Drawing of the Proposed Bridge
  - ☐ Pier Width
  - ☐ Elevation of Low Chord
  - ☐ Elevation of Low Point in Approach Grade
  - ☐ Existing Bridge Data (if applicable)
- ☐ Copy of DNR Letter Pre-Approving Design Hydrology (50 yr. & 100 yr. flood discharges) and Valley Cross-Section/Rating Curve.
- ☐ Hydraulic Calculations, Including the Following:
  - ☐ Printout of Bridge Hydraulic Analysis from IDOT Bridge Backwater Analysis Software.
  - ☐ Disk or CD with data file (.ibh extension) from IDOT Bridge Backwater Analysis Software
  - ☐ Completed “Accelerated Bridge Review Process Analysis Guide & Summary” Form
- ☐ Letter Requesting Out-of-Order Review of Project



Date: \_\_\_\_\_  
Completed By: \_\_\_\_\_

## Accelerated Bridge Review Process Analysis Guide & Summary

**Application:** Completed and Signed Joint Application Form Submitted? Yes \_\_\_\_\_ No \_\_\_\_\_

Applicant Name: \_\_\_\_\_

Location: \_\_\_\_\_ Sec \_\_\_\_\_, T \_\_\_\_\_ N, R \_\_\_\_\_, County: \_\_\_\_\_

Stream(s): \_\_\_\_\_

### When Permit Required:

**567—71.1 (455B) Bridges, culverts, temporary stream crossings, and road embankments.** Approval by the department for the construction, operation, and maintenance of bridges, culverts, temporary stream crossings, and road embankments shall be required in the following instances.

**71.1(1) Rural area—floodway.** In rural areas, bridges, culverts, road embankments, and temporary stream crossings in or on the floodway of any river or stream draining more than 100 square miles. (NOTE: Channel modifications associated with bridge, culvert or roadway projects may need approval; see 567—71.2(455B).)

**71.1(2) Rural area—floodway and flood plain.** Road embankments located in the floodway or flood plains, but not crossing the channel of a river or stream draining more than 10 square miles, where such works occupy more than 3 percent of the cross-sectional area of the channel at bankfull stage or where such works obstruct more than 15 percent of the total cross-sectional area of the flood plain at any stage. In determining a 15 percent occupancy of the flood plain, the concept of equal and opposite conveyance as defined in 567—Chapter 70 shall apply.

**71.1(3) Urban areas.** In urban areas, bridges, culverts, road embankments and temporary stream crossings in or on the floodway or flood plains of any river or stream draining more than 2 square miles.

**567—71.2 (455B) Channel changes.** Approval by the department for the construction, operation, and maintenance of channel changes shall be required in the following instances.

**71.2(1) Rural areas.** In rural areas:

b. Channel changes associated with road projects in or on the floodway of any stream draining more than 10 square miles at the location of the channel change whereby either (i) more than a 500-foot length of the existing channel is being altered or (ii) the length of existing channel being altered is reduced by more than 25 percent.

**71.2(2) Urban areas.** In urban areas channel changes on any river or stream draining more than 2 square miles at the location of the channel change.

**71.2(3) Protected streams.** Channel changes at any location on any river or stream designated as a protected stream pursuant to division III of 567—Chapter 72.

Located within a Corporate Limits? Yes \_\_\_\_\_ No \_\_\_\_\_ (If “Yes”, this project does not qualify for the Accelerated Review Process)

Channel Change Involved? Yes \_\_\_\_\_ No \_\_\_\_\_

Channel Change >500 ft or reduces length by more than 25%?

Yes \_\_\_\_\_ No \_\_\_\_\_ (If “Yes”, this project does not qualify for the Accelerated Review Process)

Is There a Detailed Flood Insurance Study (FIS) On This Stream?

Yes \_\_\_\_\_ No \_\_\_\_\_ (If “Yes”, this project does not qualify for the Accelerated Review Process)

Are There Low-Head Dams or Levees Associated With This Project Design?

Yes \_\_\_\_\_ No \_\_\_\_\_ (If “Yes”, this project does not qualify for the Accelerated Review Process)

## Engineering Plans

Engineering Plans: 2 Sets of Certified Plans Submitted? Yes \_\_\_\_\_ No \_\_\_\_\_

Location Map Included? Yes \_\_\_\_\_ No \_\_\_\_\_ (*Quad Maps Available at <http://ortho.gis.iastate.edu/>*)

Site Map Included? Yes \_\_\_\_\_ No \_\_\_\_\_

Survey Datum: \_\_\_\_\_ (NGVD, other, explain)

Typical Channel Width (Bank-to-Bank): \_\_\_\_\_ Channel Bottom Elevation: \_\_\_\_\_

Average Flood Plain Elevation: \_\_\_\_\_

Record High Water Elevation: \_\_\_\_\_ Date: \_\_\_\_\_ Source: \_\_\_\_\_

Existing Bridge Length: \_\_\_\_\_ Proposed Bridge Length: \_\_\_\_\_

Bridge Skew (Degrees): Bridge to Stream: \_\_\_\_\_

Piers to Stream: \_\_\_\_\_

Abutments to Stream: \_\_\_\_\_

Low Steel (Chord) Elevation: At Right Abutment \_\_\_\_\_

At Left Abutment \_\_\_\_\_

At Mid Span \_\_\_\_\_

Abutment Berm Elevation: Left \_\_\_\_\_ Right \_\_\_\_\_ Side Slopes: \_\_\_\_\_

Pier Width: \_\_\_\_\_ Pier Type (T-Pier, Pile Bent, other): \_\_\_\_\_

Extent of Roadgrade Change (length, elevation, etc.): \_\_\_\_\_

Channel Excavation for Transition (expansion/contraction)? Yes \_\_\_\_\_ No \_\_\_\_\_

Explain: \_\_\_\_\_

## **Hydraulics & Hydrology:**

Copy of DNR letter Pre-Approving Hydrology and Rating Curve Included? Yes \_\_\_\_\_ No \_\_\_\_\_

Drainage Area: \_\_\_\_\_

Hydrology: 50 year Flood Discharge \_\_\_\_\_ 100 Year Flood Discharge \_\_\_\_\_

Source of Discharge Information (Check One):

USGS Regional Equations \_\_\_\_\_

Corps Study \_\_\_\_\_

WRC 17B analysis of Gage Data \_\_\_\_\_

Other \_\_\_\_\_

Stream Slope: \_\_\_\_\_ ft/ft

\_\_\_\_\_ ft/mi Source (topo map, \*survey, other): \_\_\_\_\_

\_\_\_\_\_  
*\*(Note: If surveyed profile is used to determine stream slope, the length should be sufficient so as to be representative of the typical stream slope.)*

Surveyed Valley Cross-Section Included? (Full Valley Section Required) Yes \_\_\_\_ No \_\_\_\_

Site Plan Showing Location of Cross-Section Included? Yes \_\_\_\_ No \_\_\_\_

Rating Curve and Backwater Calculations Included? (Use of IDOT Bridge Backwater Software Required)

Printed Copy? Yes \_\_\_\_ No \_\_\_\_

Disk or CD? Yes \_\_\_\_ No \_\_\_\_

Mannings "n" Value Used:

Channel \_\_\_\_\_ Left Overbank \_\_\_\_\_ Right Overbank \_\_\_\_\_

(Typical "n" Values are listed at the end of this document)

Photographs Included to Verify "n" Values? Yes \_\_\_\_ No \_\_\_\_

Upstream Damage Potential (describe): \_\_\_\_\_

Field Verified? Yes \_\_\_\_ No \_\_\_\_

Photographs Included? Yes \_\_\_\_ No \_\_\_\_

#### Summary:

	50 yr. Flood	100 yr. Flood
Discharge (cfs)	_____	_____
Water Surface Elev.	_____	_____
Backwater	_____	_____
*Velocity	_____	_____
Freeboard	_____	_____
Waterway Opening (sq. ft.)	_____	_____
Road Grade Overflow (cfs)	_____	_____

\*Are Velocities Excessive? Yes \_\_\_\_ No \_\_\_\_\_. If "Yes", What Stabilization Methods are Being Used? \_\_\_\_\_

#### Approval:

##### Approval Criteria:

**567—72.1 (455B) Bridges and road embankments.** The following criteria shall apply to the construction, operation, and maintenance of bridges and road embankments.

**72.1(I) Bridges and road embankments affecting low damage potential areas.** For bridges and road embankments affecting floodway or flood plain areas having a low flood damage potential, the following criteria will apply:

- Backwater Q50. The maximum allowable backwater for Q50 and lesser floods is limited to 0.75 foot.
- Backwater Q100. The maximum allowable backwater for Q100 is limited to 1.5 feet.
- Freeboard. The minimum freeboard for low superstructure horizontal bridge members above Q50 is 3 feet.

Does Bridge Project Satisfy Criteria? Yes \_\_\_\_ No \_\_\_\_

## Out of Order Processing Requested:

### Criteria for Out of Order Processing:

*567—70.5(2) (455B) Order of processing. In general, complete applications including sufficient plans and specifications shall be reviewed in the order that complete information is received. However, when there are a large number of pending applications, which preclude the department from promptly processing all applications, the department may expedite review of a particular application out of order if the completed application and supporting documents were submitted at the earliest practicable time and any of the following conditions exist:*

- a. Relatively little staff review time (generally less than four hours) is required and delay will cause the applicant hardship;*
- b. The applicant can demonstrate that a delay in the permit will result in a substantial cost increase of a large project;*
- c. Prompt review of the permit would result in earlier completion of a project that conveys a significant public benefit;*
- d. The need for a permit is the result of an unforeseen emergency or catastrophic event; or*
- e. A permit is needed to complete a project that will abate or prevent an imminent threat to the public health and welfare*

Request Made for Out of Order Processing? Yes \_\_\_\_ No \_\_\_\_

If "Yes", basis for request: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Typical Mannings “n” Coefficients for Natural Stream Valleys

### Channel

#### Small to medium drainage areas

Irregular section, meandering channel, rocky or rough bottom, medium to heavy growth on bank and side slopes.	0.04 – 0.05
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Uniform section, relatively straight, Smooth earthen bottom, medium to Light growth on bank and side slopes.	0.03 – 0.04
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Large drainage area	0.025 – 0.35
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### Overbank Flood Plain Areas

#### Pasture land

No brush or trees	0.05 – 0.07
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Light brush and trees	0.06 – 0.08
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Crop Land	0.07 – 0.09
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#### Brush and Trees

Heavy weeds, scattered brush	0.08 – 0.10
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Medium to dense brush and trees	0.09 – 0.12
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Dense Brush and Trees	0.10 – 0.15
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Heavy stand of timber, a few downed trees, little undergrowth	0.07 – 0.10
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